

Run IIb Schedule Status

- Brief overview of April/May reports (milestones)
- ◆ COBRA output, the DOE and change requests
- Summary/Conclusions



April Milestone Overview

L2/Directo	r's Milestones	vs Current For	ecast			
(Sorted	by L2/Director	's Baseline Da	te)			
Milestone Description	L2/Director's Baseline (4/03)	Last Month's Forecast (3/03)	This Month's Forecast (4/03)	L2/Director's Variance (work days)	Monthly Variance (work days)	Notes
WBS 1.1 Silicon Tracker						
Silicon Prototype Mechanical Stave Built	01/06/03	12/18/02	12/18/02	(6)	0	Complete
L2-L5 Silicon Sensors Released For Production	03/24/03	04/01/03	04/16/03	17	11	Complete
SVX4 Released For Production	10/20/03	09/25/03	09/25/03	(17)	0	
Successful Readout Of Full Silicon Stave	01/29/04	10/17/03	10/13/03	(68)	(4)	
Silicon Module Production Begun	07/15/04	05/21/04	06/10/04	(24)	13	l .
All Silicon Sensors Delivered And Tested	12/09/04	09/08/04	09/23/04	(53)	11	l .
All SVX4 Chips Produced And Tested	12/21/04	08/09/04	08/09/04	(93)	0	l .
All Silicon Hybrids Produced And Tested	03/03/05	11/15/04		(69)	(1)	
Silicon Stave Production Begun	03/08/05		11/29/04	(63)	(1)	
Silicon Module Production And Testing Complete	07/22/05		03/25/05	(83)	(1)	
Downstream Silicon Readout Ready for Installation On Platform	10/25/05			(107)	0	l
Silicon Stave Production Complete	12/22/05			(101)	(1)	
South Silicon Complete	02/10/06			(106)	0	l
North Silicon Complete	05/04/06	11/08/05	11/07/05	(118)	(1)	
Silicon Ready To Move To DAB	05/25/06	11/29/05	11/28/05	(120)	(1)	
WBS 1.2 Trigger						
L1 Trigger Cal-Trk Match Production and Testing Completed	09/23/04	08/12/04	08/12/04	(29)	0	l
L2 Silicon Track Trigger Production and Testing Complete	10/17/05	12/08/04	12/08/04	(212)	0	l
L1 Calorimeter Trigger Production And Testing Complete	01/05/06	04/11/05	05/31/05	(146)	35	l
L2 Beta Trigger Production And Testing Complete	01/05/06	02/28/05	02/28/05	(211)	0	l
L2 Trigger Upgrade Production and Testing Complete	01/05/06	02/28/05	02/28/05	(211)	0	l
L1 Central Track Trigger Production And Testing Complete	01/10/06	03/10/05	02/23/05	(217)	(11)	
L1 Trigger Upgrade Production and Testing Complete	01/10/06	04/11/05	05/31/05	(149)	35	
WBS 1.3 Online/DAQ						
Online System Production and Testing Complete	10/07/05	06/17/05	06/17/05	(78)	0	



May Milestone Overview

LZ/Director's milestones	vs current ron	ecast	
(Sorted by L2/Director	's Baseline Da	te)	
	Last Month's	This Month's	Г

100110	(Socied by Explicator's Esperime Date)											
	L2/Director's	Last Month's Forecast	This Month's Forecast	L2/Director's Variance (work	Monthly Variance (work							
Milestone Description	Baseline (4/03)	(4/03)	(5/03)	days)	days)	Notes						
WBS 1.1 Silicon Tracker												
Silicon Prototype Mechanical Stave Built	01/06/03	12/18/02	12/18/02	(6)	0	Complete						
L2-L5 Silicon Sensors Released For Production	03/24/03	04/16/03	04/16/03	17	0	Complete						
SVX4 Released For Production	10/20/03	09/25/03	09/25/03	(17)	0							
Successful Readout Of Full Silicon Stave	01/29/04	10/13/03	10/21/03	(62)	6							
Silicon Module Production Begun	07/15/04	06/10/04	07/09/04	(4)	20							
All Silicon Sensors Delivered And Tested	12/09/04	09/23/04	09/23/04	(53)	0							
All SVX4 Chips Produced And Tested	12/21/04	08/09/04	08/09/04	(93)	0							
All Silicon Hybrids Produced And Tested	03/03/05	11/12/04	11/19/04	(64)	5							
Silicon Stave Production Begun	03/08/05	11/29/04	12/06/04	(58)	5							
Silicon Module Production And Testing Complete	07/22/05	03/25/05	04/01/05	(78)	5							
Downstream Silicon Readout Ready for Installation On Platform	10/25/05	05/24/05	05/24/05	(107)	0							
Silicon Stave Production Complete	12/22/05	07/29/05	08/05/05	(96)	5							
South Silicon Complete	02/10/06	08/31/05	09/20/05	(93)	13							
North Silicon Complete	05/04/06	11/07/05	11/14/05	(113)	5							
Silicon Ready To Move To DAB	05/25/06	11/28/05	12/05/05	(115)	5							
WBS 1.2 Trigger												
L1 Trigger Cal-Trk Match Production and Testing Completed	09/23/04	08/12/04	08/12/04	-29	0							
L2 Silicon Track Trigger Production and Testing Complete	10/17/05	12/08/04	12/08/04	-212	0							
L1 Calorimeter Trigger Production And Testing Complete	01/05/06	05/31/05	05/02/05	-166	(20)							
L2 Beta Trigger Production And Testing Complete	01/05/06	02/28/05	02/28/05	-211	0							
L2 Trigger Upgrade Production and Testing Complete	01/05/06	02/28/05	02/28/05	-211	0							
L1 Central Track Trigger Production And Testing Complete	01/10/06	02/23/05	02/23/05	-217	0							
L1 Trigger Upgrade Production and Testing Complete	01/10/06	05/31/05	05/02/05	-169	(20)							
WBS 1.3 Online/DAQ	40407107	00147707	00147107	(780)								
Online System Production and Testing Complete	10/07/05	06/17/05	06/17/05	(78)	0							



Director's Milestones

						2003	2004	2005	2006
ID	Name		Forecast	Baseline	Variance	Q1 Q2 Q3 Q	4 Q1 Q2 Q3	Q4 Q1 Q2 Q	3 Q4 Q1 Q2 Q3 Q
	1.1 Silicon Tracker	Constructive Contract							THE COLUMN TWO IS NOT THE OWNER.
565	Silicon Prototype Mechanical	Stave Built	12/18/02	1/6/03	-1.2 w	*			
91	L2-L5 Silicon Sensors Release	ed For Production	4/16/03	3/24/03	3.4 w	-			Baseline
138	SVX4 Released For Production	1	9/25/03	10/20/03	-3.4 w	1000	(*)	$ \langle \rangle _{F}$	orecast
439	Successful Readout Of Full Si	licon Stave	10/21/03	1/29/04	-12.4 w		$\Diamond \bullet$, , , , , , , , , , , , , , , , , , ,	
649	Silicon Module Production Be	gun	7/9/04	7/15/04	-0.8 w		300000		
139	All SVX4 Chips Produced And	Tested	8/9/04	12/21/04	-18.6 w		7	♦	
105	All Silicon Sensors Delivered	And Tested	9/23/04	12/9/04	-10.6 w			00	
228	All Silicon Hybrids Produced	And Tested	11/19/04	3/3/05	-12.8 w			0.	
804	Silicon Stave Production Beg	in	12/6/04	3/8/05	-11.66 w			0.	
693	Silicon Module Production An	d Testing Complete	4/1/05	7/22/05	-15.5 w			0	•
415	Downstream Silicon Readout	Ready for Installation On Platform	5/24/05	10/25/05	-21.4 w			~ ~	s* b
829	Silicon Stave Production Com	plete	8/5/05	12/22/05	-19.26 w			100	0 6
903	South Silicon Complete	72),	9/20/05	2/10/06	-18.6 w				0
928	North Silicon Complete	11/14/05	5/4/06	-22.66 w				0 •	
931	Silicon Ready To Move To DAB		12/5/05	5/25/06	-23.06 w				8
	1.2 Trigger		(A) (C) (A) (A) (A) (A) (A) (A) (A) (A) (A) (A	A DESCRIPTION OF	200000000				
168		uction and Testing Completed	8/12/04	9/23/04	-5.8 w			^	
354	L2 Silicon Track Trigger Produ	action and Testing Complete	12/8/04	10/17/05	-42.4 w		1	*	40
227	L1 Central Track Trigger Prod	uction And Testing Complete	2/23/05	1/10/06	-43.4 w			^^	
270	L2 Beta Trigger Production Ar	NO MANAGEMENT OF THE PARTY OF T	2/28/05	1/5/06	-42.2 w			×	X
355	L2 Trigger Upgrade Productio	n and Testing Complete	2/28/05	1/5/06	-42.2 w			X	X
112	L1 Calorimeter Trigger Produc	78 THE RESERVE THE TOTAL PROPERTY OF THE PARTY OF THE PAR	5/2/05	1/5/06	-33.2 w				. X
228	L1 Trigger Upgrade Productio		5/2/05	1/10/06	-33.8 w			\ X	
		Tall Testing Compete	u.z.es					\	(T
154	1.3 Online Online System Production and	Tanting Commission	6/17/05	10/7/05	-15.6 w				
104	Online System Froduction and	resting complete	6/1//05	10//05	*10.6 W			1 .	∨ ▼
taus	t: D0 Run lib Upgrade Date: 5/31/03 Sate: 6/26/03	Completed Milestone	Current Fore	cast 💠		Baseline	e Milestone		



Project Status - using project tools

- ◆ With respect to DOE milestones we are doing ok
- some delays with respect to aggressive schedule
 - Silicon
 - SVX4 (design delays)
 - Sensor procurement(procurement delays)
 - silicon readout hybrids (vendor delays)
 - Trigger
 - Cal L1 trigger (design issues)
 - Silicon Track Trigger (waiting for MOU/SOW)
- still well ahead of baselined Director's milestones
- Milestones are not the only measure DOE is using
 - Cost Performance Index
 - Schedule Performance Index



The CPI/SPI story

◆ SPI - Schedule Performance Index

- technically the ratio of BCWP/BCWS
 - Budgeted Cost of Work Performed comes from the % complete we update each month in the schedule
 - Budgeted Cost of Work Scheduled comes from baseline schedule
 - SPI then gives a "\$ weighted" % complete compared to the baseline
 - COBRA CPR reports SPI both for the current month and cumulative to date
- < 1 => behind schedule, > 1 => ahead of schedule
- DOE stoplights
 - Green 0.9 1.15
 - Yellow 0.85-0.89 or 1.15-1.25
 - Red < 0.85 or > 1.25



The CPI/SPI story

◆ CPI - Cost Performance Index

- technically the ratio of BCWP/ACWP
 - Budgeted Cost of Work Performed comes from the % complete we update each month in the schedule
 - Actual Cost of Work Performed comes from the actuals loaded into COBRA
 - CPI gives you an idea of how well you are conforming to your budget
 - For us, because of reporting, it always lags behind
 - COBRA CPR reports CPI both for the current month and cumulative to date
- < 1 is over spending; > 1 is under spending
- DOE stoplights
 - Green 0.9 1.15
 - Yellow 0.85-0.89 or 1.15-1.25

 $V. O'Dell, DO PMG = Red < 0.85 or > 1.25_7$



April COBRA Report

Program:DZero Runlib Equipment Thousands of \$ Report:CPR

												rwp	
			Cost Pe	rformance l		rk Breakdo	wn Structur			B	1- 4		
Contractor: Fermi National Accelerator La Location: Batavia, IL 60510	aboratory				Contract T	ype/No:		Project Na DZero Pur	me/No: nIIb Equipm	Report Per 4/1/2003	nod:	4/30/2003	
Quantity	Negotiat	ted Cost	Fet Cost	Authorized	Test	Profit/	Tgt.	Est	Share	Contract	Fet	mated Con	tract
Quantity	rvegona	eu Cost		ed Work		e %	Price	Price	Ratio	Ceiling	LSU	Ceiling	wacu
1	20.0	821		0	0	0 0	20.621	0	Nauc	0	l	0	
WBS[2]			urrent Perio	od			Cur	nulative to	Date		-	At Completic	on
WBS[3]			Actual					Actual					
	Budgete	ed Cost	Cost	Vari	ance	Budget	ed Cost	Cost	Vari	ance		Latest	
	Work	Work	Work			Work	Work	Work			l	Revised	
Item	Scheduled	Performed	Performed	Schedule	Cost	Scheduled	Performed	Performed	Schedule	Cost	Budgeted	Estimate	Variance
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.1 Run Ilb Silicon													
1.1.1 Sensors	22 38	10 6		-12 -32	10	26 77	10 30				1,689	1,689	0
1.1.2 Readout System 1.1.3 Mechanical Design and Fabrication	38	10	_		10		30 58	_			3,482 844	3,482 844	0
1.1.4 Detector Production and Testing	41	9	_	-32	- 10	68	97	_	29		1,218	1,218	0
1.1.5 Silicon Barrel Assembly	41	9		-32	0	00					1,210	1,210	0
1.1.6 Monitoring	ő	1	6	0	-6	ő	1	6		_	84	84	0
1.1.8 Administration	13	13	_	0	13		28	0		_	469	469	0
WBS[2]Totals:	146	49			39			10				9,737	0
1.2 Run IIb Trigger Upgrade	l												
1.2.1 Level 1 Calorimeter Trigger	0	0	0	0	0	0	0	0	0	0	534	534	0
1.2.2 Level 1 Calorimeter Track Matching	20	3	17	-17	-14	69	17	17	-51	1	265	265	0
1.2.3 Level 1 Tracking	0	0	0	_	0	0	_	_	_	_	395	395	0
1.2.4 Level 2 Beta Processor	0	0	0	_	0	0	_	0	_	_	61	61	0
1.2.5 Silicon Track Trigger Upgrade	48	0	0	-48	0	60	0	0			263	263	0
1.2.7 Administration	0	0	_	_	0		1	0	_	-	7	-	0
WBS[2]Totals:	69	3	17	-65	-13	129	18	17	-111	1	1,525	1,525	0
1.3 Online Systems	0	0	0	0		0	0	0	0		272	272	
1.3.1 Level 3 Systems 1.3.2 Network and Host Systems	0	0	0	_	0	0	0	0		_	531	531	0
1.3.3 Control Systems	4	1	0	_	4	ı v	1	0	_	_	226	226	0
1.3.4 DAQ/Online Management	1 4	1	0	_	- 1	i	- 1	0			21	21	0
WBS[2]Totals:	1	1	0		1	3	2	0			1,050	1,050	0
1.4 Run IIb Project Administration	l '						_			-	1,000	1,000	-
1.4.1 FY03 Administration	37	37	24	0	13	105	105	48	0	57	285	285	0
1.4.2 FY04 Administration	0	0	0	0	0	0	0	0	0	0	409	409	0
1.4.3 FY05 Administration	0	0		0	0	0	0	0			423	423	0
1.4.4 FY06 Administration	0	0	_	_	0	0	_	_	_	_	386	386	0
WBS[2]Totals:	37	37	24	0	13	105		-	_		1,502	1,502	0
Gen. and Admin.	0	0	0	0	0	0	0	0	0	0	0	0	0
Undist. Budget	0					400	0.10			4	0	0	0
Sub Total	253	91	51	-162	41	466	349	75	-117	275	13,814	13,813	0
Management Resrv.	252	04	F.4	400	41	400	940	70	447	020	6,807	6,807 20,621	0
Total	253	91	51	-162	41	466	349	75	-117	275	20,621	20,621	0

Equipment only

~3.4% of project scheduled complete

Current period

cumulative

15-Jul-03



May COBRA Report

Program:DZERO RUNIIB Thousands of \$ Report:CPR

			Cost Per	formance F	Report - Wor	rk Breakdov	wn Structure	÷						
Contractor:	atory	Contract Type/No: Project Name/No: Report Period:												
Location:	Batavia							DZero Run	OZero Runlib Equipm 4/30/2003			5/31/2003		
Quantity	Negotiated Cost Est. Cost Authorized				Tgt. Profit/ Tgt.			Est Share	Contract	Est	imated Contract			
	l		Unpriced Work		Fee % Price		Price	Ratio	Ceiling	l	Ceiling			
1	20,0)	0	0	20,621	0		0		0		
WBS[2]		C	urrent Perio	d			Cur	mulative to	Date		p	t Completio	n	
WBS[3]			Actual					Actual			l			
	Budget		Cost	Vari	ance		ed Cost	Cost	Vari	ance		Latest		
	Work	Work	Work			Work	Work	Work				Revised		
Item	Scheduled		Performed	Schedule	Cost	Scheduled		Performed	Schedule	Cost	Budgeted	Estimate	Variance	
(1) 1.1 Run IIb Silicon	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
1.1 Run lib Silicon 1.1.1 Sensors	21	24	0		24	48	34	0	-14	34	1.688	1.688		
	11	-10		-21	-10						.,		0	
1.1.2 Readout System		-10 32	_	-21 -9			20 90				3,490	3,491	0	
1.1.3 Mechanical Design and Fabrication 1.1.4 Detector Production and Testing	41 33	32 8		-9 -25			105	_			843	843	0	
1.1.5 Silicon Barrel Assembly	33	0		-25		101					1,218 1,950	1,218 1.950	0	
1.1.6 Monitoring	1	0		-1	0	1 1	1	6			1,950	1,950	0	
1.1.8 Administration	15	19		4	19				_	47	466	466	0	
WBS[2]Totals:	122	73		-48							9.740	9.740	U	
1.2 Run IIb Trigger Upgrade	122	1.3	10	-40	D/	291	290	21	U	2/1	9,740	9,740	U	
1.2.1 Level 1 Calorimeter Trigger	0	0	0	0	0	0	0	0	0	0	534	534		
1.2.1 Level 1 Calorimeter Trigger 1.2.2 Level 1 Calorimeter Track Matching	8	-3		-12		_	_				266	266	U	
1.2.3 Level 1 Calonmeter Track Matching	0			-12		29				14	395	395	U	
1.2.4 Level 2 Beta Processor	0	0	_	0		0	_	_	-	0	61	61	0	
1.2.5 Silicon Track Trigger Upgrade	3	0		-3		7	0	_	-	0	263	263	0	
1.2.5 Silicon Hack Higger Opgrade 1.2.7 Administration	0	0		0		1 1	1	0			7	7	0	
WBS(2)Totals:	11	-3		-14	14				_	15	1,526	1.526	0	
1.3 Online Systems		-3	-17	-14	14	31	10		-22	10	1,526	1,020	u	
1.3.1 Level 3 Systems	0	0	0	0	0	0	0	0	0		272	272		
1.3.2 Network and Host Systems	0	0		0		0				0	531	531	0	
1.3.3 Control Systems	1	0		0		2		0	_	1	226	226	0	
1.3.4 DAQ/Online Management	1	1	0	0		2				2	21	21	n n	
WBS[2]Totals:		- 1	0	0		4	3			9	1.050	1.050	n n	
1.4 Run IIb Project Administration	Ι '		0	U	'	· "			-1	3	1,000	1,000	U	
1.4.1 FY03 Administration	36	36	21	0	15	140	140	68	0	72	285	285	n	
1.4.2 FY04 Administration	0	0		0		140				12	409	409	n n	
1.4.3 FY05 Administration	0	0		0		ő				0	423	423	0	
1.4.4 FY06 Administration	0	0	_	0	_	ő	_	_	_	0	386	386	0	
WBS(2)Totals:	36	36	_	0		_	_	_	0	72	1,502	1.502	0	
Gen. and Admin.	0	0		0		140			_		1,502	1,502	0	
Undist. Budget	, i					Ů					ő	ő	0	
Sub Total	170	107	20	-63	87	479	456	95	-23	361	13,818	13,818	0	
Management Resrv.											6,803	6,803	0	
Total	170	107	20	-63	87	479	456	95	-23	361	20,621	20,621	0	
*Adjusted Total	170	107	20	-63	87	479	456	380	-23	76	20,621	20,621	0	

Equipment only

~3.5% of scheduled complete

May, 2003

^{*\$135}K of accruals that should have been incurred in the month of May were added to the ACWP and \$150K in effort corrections. The effort correction is reflected in the June report; the accruals will be brought up-to-date in the July reporting period.



What is our SPI/CPI?

April

- cumulative SPI = 0.75
- cumulative CPI = 4.6

May

- cumulative SPI = 0.95
 - are formally entering change controls for this
- cumulative CPI = 1.2
 - some equipment erroneously charged to R&D fixed for next month, fixed by hand for May
 - accruals put in by hand



What we learn from this

SPI

- change control will be implemented for more than just missing/slipping milestones
- tasks that contribute "significantly" to SPI must submit change control
- all of these change controls are internal to the project
 - need to be signed off by L3/L2/PM
 - needed to keep the project on track!

CPI

- by definition this lags because of project accounting system
 - using costs, not obligations
 - fixed by calculating accruals each month



Schedule/Status conclusions

- ◆ Upcoming (internal) Change Controls
 - digital jumper cables (no longer needed for test stands)
 - we've known this for a while, but have ignored it since it isn't critical path
 - STT (delayed due to MOU/SOW)
 - Cal Track-Match (delays due to delays in procurement/PRRs)
- None of these are critical path items
- We are in the process of formally signing off on these
 - internal to project (no cost \$ or director's milestones involved)
 - still we need L3/L2/PM signatures



Summary

- Continuing to manage aggressively
 - ◆ Forecast completion date slipped slightly from November 28 to December 5, 2005; EIR/DOE schedule finish May 25, 2006
 - Regularly reviewing schedule to optimize the plan
 - Looking at variances from aggressive schedule
 - Month-to-month differences in forecasts
 - Variance wrt DOE baseline dates
 - Missed L2-L5 sensor order baseline date by 3.4 weeks
 - Current forecast is within 4 days of baseline date for "Silicon Module Production Begun" (7/15/04). Exploring ways to mitigate.
 - Other milestones have significant cushion remaining.
- SPI/CPI being used to keep project on track
 - forces us to better document project via change control
 - keeps our focus on all tasks, not just critical path items